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**B.E / B.Tech ( Full Time ) DEGREE END SEMESTER EXAMINATIONS, NOV / DEC 2012**

**MANUFACTURING**

Semester VIII

**ME 9027 MANAGEMENT SCIENCE**

(Regulation 2008)

Time : 3 Hours

Answer ALL Questions

Max. Marks 100

**PART-A (10 x 2 = 20 Marks)**

1. What are the basic characteristics of LPP?
2. What is the objective of sensitivity analysis?
3. List the basic difference between CPM and PERT.
4. What is the advantage of North West Corner Method?
5. List out the reasons for carrying Inventory.
6. What is the purpose of ABC and XYZ selective inventory control techniques?
7. What are the queue characteristics?
8. List out any four advantages of simulation techniques.
9. What is group replacement?
10. Explain the dominance rule of game theory.

**Part – B ( 5 x 16 = 80 marks)**

11. Two types of TV sets are produced with a profit of Rs. 60 from each TV of type A and Rs. 40 from each TV of type B. 2 and 3 units of raw materials are required to produce one TV of type A and type B respectively. 4 and 2 units of time are required to produce on TV of type A and type B respectively. If 100 units of raw materials and 120 units of time are available, formulate the problem and solve by graphical method or otherwise to decide how many units of each type of TV should be produced to maximize profit.
12. a) A travelling salesman has to visit five cities. He wishes to start from a particular city, visit each city once and then return to his starting point. The travelling cost (in Rs. '000) of each city from a particular city is given below:

		To city				
		A	B	C	D	E
From city	A	∞	2	5	7	1
	B	6	∞	3	8	2
	C	8	7	∞	4	7
	D	12	4	6	∞	5
	E	1	3	2	8	∞

What is the sequence of visit of the salesman so that the cost is minimum?

OR

b) A project schedule has the following characteristics:

Activity	Times (weeks)	Activity	Times (weeks)
1 - 2	4	5 - 6	4
1 - 3	1	5 - 7	8
2 - 4	1	6 - 8	1
3 - 4	1	7 - 8	2
3 - 5	6	8 - 10	5
4 - 9	5	9 - 10	7

- Construct the network diagram.
- Compute E and L for each event, and find the critical path.

13. a) An aircraft company uses rivets at an approximately constant rate of 5,000 kg per year. The rivets cost Rs. 20 per kg and the company personnel estimate that it costs Rs. 200 to place an order and the carrying cost of inventory is 10 per cent per year.

- How frequently should orders for rivets be placed, and what quantities should be ordered for?
- If the actual costs are Rs. 500 to place an order and 15 per cent for carrying cost, the optimal policy would change. How much is the company losing per year because of imperfect cost information?

OR

b) A company is considering a selective inventory control using the following data:

Item	Units	Unit cost (Rs)	Item	Units	Unit cost (Rs)
1	6,000	4.00	9	20,250	0.40
2	61,200	0.05	10	90,000	0.10
3	16,800	2.10	11	29,940	0.30
4	3,000	6.00	12	24,660	0.50
5	55,800	0.20			
6	22,680	0.50			
7	26,640	0.65			
8	14,760	0.40			

The intention is to have ABC plan to selective control. Arrange the data for presentation to management.

14. a) There is congestion on the platform of a railway station. The trains arrive at the rate of 30 trains per day. The waiting time for any train is exponentially distributed with an average of 36 minutes. Calculate the following:

- The mean queue size.
- The probability of that queue size exceeds 10.

OR

- b) A company manufactures around 200 mopeds. Depending upon the availability of raw materials and other conditions, the daily production has been varying from 196 mopeds to 204 mopeds, whose probability distribution is as given below:

Production/day:	196	197	198	199	200	201	202	203	204
Probability:	0.05	0.09	0.12	0.14	0.20	0.15	0.11	0.08	0.06

The finished mopeds are transported in a specially designed three-strayed lorry that can accommodate only 200 mopeds. Using the following 15 random numbers: 82, 59, 78, 24, 53, 61, 18, 45, 23, 50, 77, 27, 54 and 10, simulate the mopeds waiting in the factory?

- What will be the average number of mopeds waiting in the factory?
  - What will be the number of empty spaces in the lorry?
15. a) Using dominance property and solve the following game and also find the value of the game.

		Player B		
		B <sub>1</sub>	B <sub>2</sub>	B <sub>3</sub>
Player A	A <sub>1</sub>	1	7	2
	A <sub>2</sub>	6	2	7
	A <sub>3</sub>	5	1	6

OR

- b) A machine costs Rs. 6000. The running cost and salvage value of the end of the year is given below:

Year	1	2	3	4	5	6	7
Running cost (Rs)	1200	1400	1600	1800	2000	2400	3000
Salvage value (Rs)	4000	2666	2000	1500	1000	600	600

If interest rate is 10% per year, find when the machine is to be replaced.

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